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Indigenous Beliefs, Knowledge and Practices on Fishing and Climate Change Adaptation

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Abstract

San Sebastian, one of the four fishing villages in the Eastern part of the Municipality of Lagonoy in the Philippines stays susceptible and at threat from weather-related disasters. Altering the fishery systems in Lagonoy Gulf (Pacific) where local artisanal and subsistence fishers are totally structured for their economic enterprise, require sustainable climate change adaptation measures. In achieving this end, the present study explored the indigenous fisheries practices of fishers, in phases of production, process, marketing, and management plan; determined adaptive strategies towards perceived influence of climate change in the habits of fishing activities; and assessed the knowledge and awareness of climate change adaptation amongst fishers and local officials. The qualitative methodology supplied the main instrument for this study. For the statistics presentation on adaptive techniques, and knowledge and awareness on climate change, quantitative methodology have been considered. A whole of 25 experts participated in the focus group discussion (FGD) and key informant interview (KII). The manual coding of information frequency was carried out by indicating the wide variety of text that the respondents made for a specific statement. For the analysis, solely eight most recorded modifications have been considered. Finally, informants expressed pastime and aid to any local weather alternate initiative, and believed they are prepared to put up *bayanihan* efforts (a spirit of communal cooperation) to help hold the environment. On the contrary, informants expressed claims of unfair treatment of local fishers when authorities failed to take action towards transient fish poachers who overfish and fished destructively.

Keywords: *Climate Change, Fishing Practices, Indigenous Knowledge, KAP*

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1. Introduction

While typhoon Sening brought havoc to almost all parts of the Philippines, yet the experience of the residents living within the fishing communities in the Eastern coastal barangays of Lagonoy, Camarines Sur was terrifically haunting. They were hit by three successive big waves (typhoon surges) that knockdown and reduced almost 80 percent of the houses in these fishing villages. The aftermath of the incident took many lives that were washed out from neighboring barangays of the Province of Albay. Today, while many have already forgotten such nightmare, only a few residents then realized what happened that faithful night in 1970 has a direct implication on climate change. Climate change devastating impacts, however, may continue to happen and that the village people of this locality may also continue to experience similar destructive storms and “climate hazards” (Hsu et al., 2011; Ko & Chang, 2012 cited in Jhan, 2017), or "other external challenges that act as a threat-multiplier to vulnerability to climate change impacts" (Zalameda, 2015). This phenomenal issue has been confirmed by many climate scientists that “hundred-year storms - storms that have a 1% chance of occurring during any given year - will happen more often” now (Bolich, 2013).

For this reason, this study tries to communicate at the community levels through knowledge and awareness building as an effort that could address climate change adaptation in order to lessen the negative influences on its natural environment and to the local people particularly amongst fishers and barangay officials. The research conducted focus group discussions (FGDs) as well as semi-structured interviews with fishers and selected barangay officials. This study aids to explore the indigenous knowledge of fishers on their fishing practices and fisheries climate change adaptation. Such a feat is, therefore, necessary for three reasons. Firstly, many studies are focused more on national issues than with the community level. Second, the present study addresses the people's needs to anticipate from the "increase pressure on the coastal ecosystems (Mamauag, n.d. cited in Burke et al., 2012; MSN Threat Assessment Workshop, 2014). These pressures are in the form of "rising coastal development, increasing levels of pollution and sedimentation, and increasing densities of fishers, leading to overfishing and destructive fishing practices" (Mamauag, n.d. cited in Burke et al. 2012; MSN Threat Assessment Workshop, 2014). Lastly, it can draw-in positive ideas from the FGD and KII in which the community can take advantage of or to act on it.

For example, “preventing overfishing will be a critical part of addressing the threat that climate change poses” because global warming “hinders the recovery of overfished populations” (UC, 2019). Then now, what? Perhaps the community can formulate adaptive strategies against perceived negative changes in this context, say, by way of biodiversity. Preserving local biodiversity, according to Smithsonian (2016), is not only of “genetic insurance value, but that it is an imperative for human life." Therefore, there is a strong need to “conserve and protect coastal habitats” (OMLopez Center, 2015), as in the case of San Sebastian.

The study intends to assess the effect of climate change on priority fisheries commodities in the area by documenting traditional fisheries practices, perceptions of recent changes in local fisheries conditions and fisheries climate change adaptation strategies.

2. Literature review

2.1. Direct and Indirect Impact of Climate Change

According to Cardwell (2011), cited in Lubos and Lubos (2019), many of the changes that are noticeable to the ecosystems, atmosphere, land surfaces including oceans and freshwater changes are actually the results of human activities. These changes may eventually provide disastrous and negative consequences to the public health as well. At this time, it is, therefore, necessary for the people to gain knowledge, attitude, and practices (KAP) awareness about climate change so that policies could be adapted as an intervention program particularly if these KAP awareness activities are research-based.

Based on the most recent available projections, which scientists expect, countries will continue to be severely threatened by the indirect and direct climate change effect which will continue to accelerate. Some of the possible projected effects that could retard the nation’s sustainable development may include the following: erosion due to increased river and coastal flooding and other dangers arising from coastal flooding – leading to coastal infrastructure extensive damage and communities, coastal ecosystems and tourism infrastructure; reduction in water resources that could ultimately redound to droughts, induce invasion of non-native species, including pest infestations. Consequently, there is a possible step that the government and even the local communities could do to carry out adaptation

measures and address such hazards by way of effective planning associated with climate change risks reduction management (Severin and Small, 2016).

2.2. Fisheries as Vital Marine Resources

Based on Bureau of Fisheries and Aquatic Resources (2010) cited in Songcuan and Santos (2013), the Philippines is the 6th fish producing country in the world, 3rd in marine plants, and 8th in aquaculture. The same agency reported further that "fish and fishery products provide about 70% of the protein requirements of about 1.6 million Filipinos." The whole island country has over 2.2 million km2 of productive fisheries which provided employment and economic support to almost 70% of the local coastal communities. The fisheries sector in 2009 has recorded a nationwide total of 1,614,368 fishing operators. From this number, most of the operators (85.0%) came from the municipal fisheries sector. Only 1.0% and 14.0% are commercial and aquaculture operators (BFAR, 2009, cited in Songcuan and Santos, 2013). The same report noted further that the fisheries sector "contributed approximately 2.2% (170.3 billion USD) to the country's GDP and export earnings of about 452 million USD" (BFAR, 2009, cited in Songcuan and Santos, 2013).

In a typical small coastal community, such the case of San Sebastian in this study, there are two types of fishers; subsistence and artisanal. Branch et al. (2002) provided these operational definitions: subsistence fishers – poor people with a long association with harvesting marine resources primarily for food, and artisanal fishers – also poor and with a longstanding cultural connection with fishing, but who intend to sell than consume catches. In particular, both types of fishers are using low-technology gear and operate within the proximity of the shore. Fisheries, is an important marine resource. It is important to understand fishers as consumers of marine resources in order to assess what legal frameworks are necessary to support current and future management policies. Whereas when the increasing illegal, unreported and unregulated (IUU) fishing practices that include overfishing or over exploitation when not properly abated or addressed the effect to local social and economic well-being will be very grievous. Fishing communities that are totally dependent on the marine resources for sustained livelihood should be the frontliners to initiate efforts to assume relevant preventative, conservation or protective management measures regarding marine environment sustainability (Maritza, 2016).

Modification or replacement of fishing gear is one of the fishers' adaptive capacity as it involves changing indigenous fishing practices for a more effective fishing. According to Jacintoa et al. (2015), fisher with knowledge and resources (budget) who successfully modified their fishing gear will not only achieve higher fish catch, or save time and fuel when fishing but even possess higher adaptive capacity. In addition, they may also demonstrate strong pro-active adaptive strategies. Adaptive strategies are the fishers' precautionary actions undertaken before, during, and after such intense weather related events.

3. Methodology

3.1. Study Area

Barangay San Sebastian is a fishing community on the Eastern coast of the municipality of Lagonoy, a second class municipality in the Province of Camarines Sur (Bicol Region) and directly fronting Lagonoy Gulf, a part of the Pacific Ocean, with a resident population of 2,101 (2015 census).

Figure 1

Map of San Sebastian, Lagonoy, Camarines Sur

Historically, Barangay San Sebastian is only accessed by paddled boat (kasko) from Barangay Sabang of the Municipality of San Jose or from mainland poblacion of Lagonoy via Quinayangan River. Barangay San Sebastian is a hotspot for climate change, although with an undocumented changes and impacts, residents are now experiencing these changes

and in fact many noted the gradual loss of biodiversity including the loss of its sea shores. There are four main river threats to the ecosystem of the place, particularly during extreme weather; one is the big flood from Lagonoy River, another is the strong river overflow from Ginorangan River, then joined by another overflow from Caguiscan River, and finally smashed together into the pounding typhoon surges of the Pacific Ocean through Lagonoy Gulf that effected the coastal frontage of the barangay proper (see Figure 1). San Sebastian, while making significant contribution to agricultural, commercial, and subsistence fisheries, climate change had great impact on their living condition, livelihood, and food security

3.2. Sources of Data

To understand the manners in which San Sebastian fishers experience and respond to change, including climate change, the researchers made several research visits to this particular fishing community. To document the changes brought about by climate change to local fishers' indigenous fishing practices and to characterize how these changes have been responded in terms of their adaptive strategies in the conduct of fishing activities, through a combination of purposive and network (snowball) sampling techniques, groups of respondents were selected (n=25). To meet triangulation, focus group discussions (FGD, n=10) and key informant interviews (KII, n=15) were conducted. The FGD comprised of subsistence and artisanal fishers while the KII included local kabataan barangay and barangay officials who were also part-time subsistence or artisanal fishers or those having only shared lived fishing experiences. According to Branch et al. (2002), subsistence fishers are poor fishers who fish or harvest marine resources for food, while artisanal fishers are also poor but sell their catch instead.

3.3. Research Design

This study used a qualitative mixed-methods research design including semi-structured interview (SSI), focused group discussion (FGD), key informant interview (KII), note taking (NT), and video recording (VR). Wynne (2015) states that the successful adoption of a barangay-based plan for adaptive strategies against perceived negative changes in fishing activities is possible provided that is "fully participatory in terms of those involved with the development, implementation, and future revision." Likewise, focus group discussion (FGDs), as explained by Nyumba et al. (2018), is used to "gain an in-depth

understanding of social issues...from a purposely selected group of individuals" and “It has high ‘face validity’ (data)” yet “low cost in relation to other methods” (Mishra, 2016). Therefore, these methods as expected provided critical advantages in achieving the ultimate purpose of this study.

Focus Group Discussion. Focus group discussion (FGD) is an encoded semi-structured interview guided by a trained moderator with the intention of identifying different perspectives of certain research topic and such that it could further offer a much better understanding of the issue from the participants’ perspectives themselves (Palaniswamy & Duraiswamy, 2018).

Key Informant Interviews. Key informant interviews (KII) is simply selecting a group of individuals who are likely to possess and give the desired information or ideas on a particular issue or research topic. When conducting KII, the interviewee needs to pay attention to two important characteristics. First, consider the number of the selected individuals to fall within the ranges from 15 to 35, unlike with the formal and informal surveys, the investigator has to interview a large number of individuals. Second, KII being a qualitative type of interview it is necessary to conduct it with interview guides. This interview guides should include topics and issues intended to be covered during the sessions. KII being an in-depth interview, it is a good practice if interviewer frames the questions before hand and takes detailed notes.

If some relevant information is omitted, the interviewee returns for the informant. It is suggested that the “unstructured nature of the interviews that invests them with special meaning and relevance in the present discussion” should be well observed (Kumar, 1996). Note taking of interviews and tape recording could not only allow proper cross-checking but made possible the taking of details, and eventually allow for a systematic transcription for analysis. The generation of comprehensive and richer data that are generally generated from the interview made the instrument truly representative of the content area being measured, as well as satisfying high content validity (Leedy & Ormrod, 2001; Lunt and Livingstone, 1996 in Mosetlhi, 2012). The interview schedule not only guided the conversation between interviewees and key informants but when other interesting and useful issues surfaced it allowed the interviewees the opportunity to follow it further. In addition, the discussions

between the key informants provided a cross sampling and triangulation of public concern and views (Mwango, 2010).

3.4. Data Collection/Gathering Procedure

The study formulated a semi-structured interview checklist (SSIC) that reflected the three main objectives of the study. Specifically, the SSIC was focussed on drawing out: a) information concerning fishers' indigenous fisheries beliefs, knowledge, practices (BKP); b) fishers' perceptions of their adaptive strategies of recent changes in local fisheries conditions brought about by climate change; and assess the knowledge and awareness of climate change adaptation amongst fishers including local barangay officials who similarly shared lived fishing experiences. The SSIC was used therefore as a suggestive guide for the FGD moderators. Providing stronger focus on CC adaptation strategies, the FG explored those problems and critical issues that the key informants have identified.

3.5. Data Analysis

The study utilized Microsoft Excel statistical pack in analyzing the interview data so as to come up with descriptive statistics such as the percentages, mean and standard deviation. Percentages were calculated to determine the data frequency. This data frequency indicates the number of text that the respondents made that particular statement. For the analysis, the researchers selected and considered only eight most recorded changes based on intensity of experience and data frequency. These results, based on the latent content analysis, were complemented with transcription of selected quotes. The language used within this report that appeared in the illustrative quotations are in the dialect of the informants in order to present an indisputable meaning of the focus groups and key informants perceptions and views.

4. Findings and Discussion

To understand participants' beliefs, knowledge, and practices on fishing and climate change adaptation, they were asked to share their opinions and familiarity with their indigenous (traditional) fisheries practices of local fishers (preparation-production, process, marketing, and management plan), their perceptions of adaptive strategies against negative

changes in local fisheries conditions, and their level of knowledge and awareness about climate change.

4.1. Indigenous (traditional) Preparation-Production Practices of Local Fishers

Indigenous preparation-production fishing practices of local fishers were discussed in terms of pre-fishing, fishing proper, and post fishing activities. As to pre-fishing preparation practices, KII and FGD informants when asked about their indigenous practices during pre-fishing disclosed that the local fishers in this small coastal fishing community prayed first before going out and doing other related pre-fishing activities such as wearing appropriate fishing clothes, inspecting fishing boat and mounting fishing engines, gears and necessary fishing paraphernalia, where majority of the informants attest to its trueness.

While the quotes below demonstrate opinions held by many, one participant maintained that *"Nagpapangadyi kami para dae abotong ning kadimalasan or remalaso sa dagat".*

Illustrative quotations from the focus groups and KII.

> *"Sa pag-sira buhay kan parasira nakataya. Kaipohan riparo ang mga kagamitan lalo na ang pag-kaigwa nin asirtadong makina ta pag-inabot kang subasko medaling kang makapoli na mayo nin remalaso."*

> *"Sa pag-lawod kaipohan mag-sulot nin sweater ta an panahon ngonian iba na – yaon biglang pag-oran o doros na makosog; kaya kaipohan an panlaban sa lipot sagkod sa oran."*

KII and FGDs when asked about their indigenous practices during actual fishing revealed that almost all fishers except one, were throwing fish baits to create or attract guipaw (school of fish). As noted, only one fisher in this community employed an improvised advanced hook and line technology using natural feathers or other artificial means to their hook to look like real fish bait. *"Saro sana man digdi an nag-gagamit nin artipisyal na pambanwit na dai nagagamit nin paon."* When asked about using light or ilaw, participants expressed concern about the negative effects of climate change. Several informants described the unpredictable weather that usually disallow them to use light or ilaw. *"Sarabay-sabay kaming nag-iilaw kung maray an panahon."* When asked about their

evening meals, the majority shared this opinion: “Nag-babalon na lang kami nin kakanon,” suggesting that they brought with them pre-packed meals.

Illustrative quotations from the focus groups and KII.

“An mga gamit me saradit na Bangka, apektado kan makosog na oran kaya perme kaming nagpopoling amay na deit an dakop .”

“An panahon ngonyan bako nang arog kadto, dae kami nakakailaw na toltol ta perming raot an panahon.”

“kami nag-dadara nin oring asin sadit na pogon para makainom nin mainit na kape o pag-maydakop igwa man kami nin maray na panira.”

KII and FGDs when asked about their indigenous practices during post fishing activities revealed that the local fishers of Barangay San Sebastian always gave thanks to the Almighty before doing other regular post fishing chores like tuning up their boat engines, repairing nets, repairing hooks and lines, and take a nap where most of the informants confirmed it.

Illustrative quotations from the focus groups and KII.

“Kaogalian kan mga parasira na taga digi sa San Sebastian na magpangadyi sa Mahal na Diyos kan saindang mga dakop sagkod an pagpasalamat sa pag-uli na mayo nin remalaso na nangyari.”

“Kaipohan mairahay an mga labot no hikot para magamit na toltol sa sonod na pag-lawod.”

4.2. Indigenous (Traditional) Fisheries Fishing Process Practices of Local Fishers.

Indigenous fishing process practices of local fishers were also discussed in terms of their fishing gears used (like fishing nets, hook and line, spear fishing or diving and the use of cage and traps). Most of those interviewed said that due to climate change, local community fishers were now compelled to change fishing gears into a more effective way such as using motorized fishing boat. In this manner they could use nets instead of reel so they could now respond faster and catch only the specific fish species intended for harvest. They illustrated further by explaining that due to climate change, “*Dakol na an may mga motor na para sira*.” When asked as to the number of local fishers they claimed that “*Mga 70*

may motor sagkod 65 an nag-gagamit pa nin sibid-sibid, kabali na an 5 para-balakwit sagkod 3 para pana".

Illustrative quotations from the focus groups and KII.

"Pag-raot an panahon mga 6 na sanang pamilya samo ang nag-papanki ta dikit man sana an dakop."

"Banwit na lang ang gamit mi pig-paonan nin pasayan o sira, madali pang isaray pag-biglang romaot an panahon."

"An mga dayong para palakaya lalong nag-dakol. Mga maisog pati sagkod maskolado kaya kadakol na kaming mga dayong kakompetensya."

4.3. Indigenous (Traditional) Fisheries Marketing Practices of Local Fishers

Indigenous marketing practices of local fishers were also discussed. Most of the artisanal fisher informants who were engaged in net fishing (para panki) claimed that certain local village markets allowed them to get supplies in exchange for their fish catch. Majority of the subsistence fishers also claimed that their daily fish catch now could hardly meet their nutritional needs. Most of the informants also expressed dismay that they can no longer produce badi due to the shortage of fish catch and poor weather condition.

Illustrative quotations from the focus groups and KII.

"Bihira na kaming maka badi ta kapos nang sira ."

"Si misis ngani binabakal na sana an dakop ko sira saka saiyang pig-reregaton"

4.4. Indigenous (Traditional) Fisheries Management Plan Practices of Local Fishers

Indigenous management plan practices of local fishers were also considered. Almost all of the informants expressed support to local fishing regulations. *"Na iintendehan me na an pag-rehestro kan samoyang baroto igwang magayon na kaabotan, pwera kan ayoda na itatao kan monesepyo sa samoya, madali kaming masosog kong kame mawara sa dagat"* (we understand the value of having registered, aside from the local government's promised assistance, they could be easily track down or find us in case we got lost in the sea). The informants also claimed that although they have not encountered any endangered fish species

incidents, yet they claimed strong support for proper fishing management in order to protect and promote the life cycle of fish species, at least on the local level. On the contrary however, there are fishing violators who are non-residents of San Sebastian. This draws attention to the need for enforcement in coastal fisheries by proper authorities. Majority also claimed that they do not fish during spawning season, and that they never use destructive fishing gears because they adhered to sustainable fishing practices that can ensure fish stocks are not depleted. Many also claimed that they do not catch older and larger fish. Moreover, according to the KII and FGD informants, all local fishers have an existing alternative means of livelihood to support them during habagat or bad weather.

Illustrative quotations from the focus groups and KII

"Mayo kaming nadadakop na endangered na sira ta an samong gamit pang-sira saradit. Ini nalalamos kan mga palotang na gamit kang ibang dayong para-sira"

"Marayo na si darakolang sira na nag-oogbon sa gilid ."

"Kaya an mga gamit mi saradit na baroto saka banwit para mapreserbar na dae maobos an mga sira pero igwang mga dayong may palakaya na nag-babayolar kaini."

"Digdi sa lugar me bawal and mayo nin ibang hanap-buhay."

"Pag-maloya an sirang dakop kami nag-guiguibo nin samhod na samong pid-titinda o kaya nag-tatanom nin mga gulayon o nag-tatrabaho sa bukid."

4.5. Fishers' Perceptions of Adaptive Strategies Against Negative Changes in Local Fisheries Conditions

Qualitative responses from KII and FGD informants regarding their perceptions of adaptive strategies that they observed to address and negate negative changes in local fisheries conditions were coded and counted for fish conservation, destructive fishing, over fishing, sustainable fishing grounds, local fish sanctuary, and marine waste management (Table 1). Generally, an encouraging finding is that all twenty-five informants (100%, items no. 4, 5, and 7) said that they always observed using any appropriate climate change adaptive strategy that would discourage illegal and destructive fishing, encourage sustainable fishing using effective gears as a measure of fishers' adaptive capacity, and encourage proper

management and control of marine wastes and pollutants. Twenty-three informants (92%) also mentioned that they always observed using climate change adaptive strategy that would discourage over fishing (item no. 3).

Table 1

Informants' rating of adaptive strategies against negative changes in local fisheries conditions.

Adaptive Strategies	Response		
	Always Observed	***Sometimes Observed***	***Do Not Observed***
1. Encourages fish conservation and control of fish stock.	21 (84%)	4 (16%)	
2. Reports illegal and destructive fishing activities.	16 (64%)	9 (36%)	
3. Discourages overfishing.	23 (92%)	2 (8%)	
4. Discourages illegal and destructive fishing.	25 (100%)		
5. Encourages sustainable fishing using effective gears as a measure of fishers' adaptive capacity.	25 (100%)		
6. Encourages creation of local fish sanctuary.			25 (100%)
7. Encourages proper management and control of marine wastes and pollutants.	25 (100%)		
8. Participates in initiatives to address the impacts of climate change on the community.	20 (80%)		

Furthermore, twenty-one informants (84%) acknowledged that they always observed taking action to encourage fish conservation and control of fish stock (item no. 1); twenty informants (80%) admitted they always observed and participated in initiatives to address the impacts of climate change on the community (item no. 8); and sixteen informants (64%) admitted they always observed reporting illegal and destructive fishing activities (item no. 2). On the contrary, all twenty-five informants (100%) do not observe giving support that would encourage the creation of local fish sanctuary (item no. 6).

Illustrative quotations from the focus groups and KII.

> *"Mayo nin taga digding para-sira na nag-oover fishing ta an gamit mi saradit na baroto sagkod saradit man na banwit o panki. An problema mi an mga dayohan may palakaya na dae napopondo."*

"Mas marhay an gamit panki ta madali an pag-dakop nin sira minsan ngani an panahon pabago-bago kaya kulang an babad sa dagat."

"An San Sebastian mayo nin pweding guibohan in fish sanctuary ta ini perming binabaha o regular na pig-aaguihan nin mga pandagat na motor."

"Mayo kaming basura ta iyan pig-kakalot mi nin hararom dagos tiglobog mi an malalapaon na mga ati, an basura kan dagat mi hali sa iba-ibang barangay kan Goa asin Lagonoy na inaatong kong may bagyo o pig-baha."

4.6. Fishers' Knowledge and Awareness on Climate Change

Qualitative responses from KII and FGD informants regarding local fishers' knowledge and awareness about climate change on local fisheries conditions were likewise coded and counted for rainfall patterns, river flooding, brackish water pollutants, brackish water quality, effect on fishers' health, erosions, weather condition, fish catch, and endangering property (Table 2).

Table 2

Informants' knowledge and awareness rating associated with climate change.

Negative Changes in Local Fisheries Conditions	Response		
	Strongly Associated	***Somewhat Associated***	***Not Associated***
Changes in weather and rainfall patterns affect normal fishing practices.	21 (84%)	4 (16%)	
Stronger and more frequent river flooding increases disturbing local benthic environment.		17 (68%)	8 (32%)
San Sebastian benthic zone partly covered with plastic wastes affects marine life.	23 (92%)	2 (8%)	
Changes in brackish and sea water quality endangers survival of local fish fry species.	25 (100%)		
Deforestation causes the destruction of local mangroves and nipa palm (nypa fruticans wurmb) due to coastal erosions and rising sea levels.	5 (20%)	2 (8%)	18 (72%)
More frequent typhoons and extreme weather.	25 (100%)		
Extinction of some fish species, bleaching of corals, result in the decrease in fish stock	23 (92%)	2 (8%)	
Climate change increases poverty.	15 (60%)	7 (28%)	3 (12%)

All the informants were able to strongly associate the more prevailing changes that they have normally observed in San Sebastian to climate change; those changes in brackish and sea water quality which endanger survival of local fish fry species (item no. 4) and those more frequent typhoons and extreme weather (item no. 6). A significant number of informants, twenty-three (93%) likewise were able to strongly associate several other changes with climate change like the extinction of some fish species, bleaching of corals that resulted in the decrease in fish stock (item no. 7) and San Sebastian's benthic zones that were partly covered with plastic waste affects marine life (item no.3). Eighteen (72%) do not associate deforestation that caused the destruction of local mangroves and nipa palm (nypa fruticans wurmb) due to coastal erosions and rising sea levels with climate change (item no. 5).

Illustrative quotations from the focus groups and KII.

"An panahon ngonian dae mo na maintendihan, parating an oran sa mayaman, biglang oran biglang wara."

"Dati an baha digdi nagdadara nin dakol na delis ngonian mga saradit nang kasili."

"Pag-naraot an mga nipa digdi apektado an paggibo nin pang-atop sa mga naraot na harong dara kan bagyo"

"An mga aki me permi nang nag-kakasipon o hilang ta an panahon yaon grabeng init o subrang lepot o kaya oran."

5. Conclusion

Generally, respondents expressed interest and support to any climate change initiative, and believed that San Sebastian, though a small coastal barangay in Eastern part of the Municipality of Lagonoy, Camarines Sur, can have a positive impact with regard to climate change issues because they are prepared to put up bayanihan efforts to help keep the environment. On the contrary, most of the informants expressed claims of unfair treatment of local fishers when proper authorities failed to take seriously their views to control fish poachers (transient fishers). Fish poachers (transient fishers) usually invaded their local fishing grounds; they overfished and fished destructively. Hence, promotion of localized management approach (like co-management between government agencies, local fishers and

local officials) and community adaptation strategy that would enable affected local fishers and the community of Barangay San Sebastian to cope with climate variability and address local fisheries problems is recommended.

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References

Bolich, R. (2013). Planning for Climate Change Adaptation: How Does the MTA Compare? (Unpublished Master's Thesis). Department of Architecture and Planning. Columbia University, New York. https://academiccommons.columbia.edu/10.7916/D8417472.

Branch, G.M., Hauck, M., Sigwana-Ndulo, N., Dye, A.H. (2002). Defining Fishers in the South Afican Context: Subsistence, Artisanal and Small-scale Commercial Sectors. South *African Journal of Marine Science*, 24 (1), 475-487. https://doi.org/10.2989/025776102784528493

Burke, L., Reytar, K., Spalding, M. & Perry, A. (2012). *Reefs at Risk Revisited in the Corral Triangle*. World resources Institute.

Hsu, Huang-Hsiung, Chia Chou, Yi-chao Wu, Mong-Ming Lu, Cheng-Ta Chen, Yung-Ming Chen (2011). *Climate Change in Taiwan: Scientific Report 2011 (Summary)*. National Science Council, Taipei, Taiwan, ROC, pp. 67

Jhan, H.T. (2017). *Evaluating Local Climate Change Adaptation along the Southwest Coastal Area in Taiwan* (Doctoral dissertation). Cardiff University, Cardiff, UK. https://orca.cardiff.ac.uk/id/eprint/100159/1/Thesis.pdf

Jacintoa, M.R., Songcuana, Songcuan, A.J.G. Yipa, G.V., Santos, M.D. (2015). Development and application of the fisheries vulnerability assessment tool (Fish Vool) to tuna and sardine sectors in the Philippines. *Fisheries Research*, 161, 174-181.

Kumar, K. (1996). *Performance Monitoring and Evaluation*, TIPS, Conducting Key Informant Interviews. https://pdf.usaid.gov/pdf_docs/PNABS541.pdf

Lubos, L.C. & Lubos, L.C. (2019). *Knowledge, Attitudes, Practices, and Action on Climate Change and Environmental Awareness of the Twenty-two Villages along the River Banks in Cagayan de Oro City, Philippines*: PART II. Bukidnon State University, Malaybalay City, Bukidnon, Philippines.

Mamauag, S.S. (n.d.) *Resiliency and Vulnerability of the Coastal Zone Against Sea Level Rise*. Marine Environment and Resources Foundation, Inc., Marine Science Institute, U.P. Diliman, Quezon City.

Maritza, Q. (2016). *An Analysis of Fisher Practices and Attitudes Towards Marine Resource Management and Regulations in St. Kitts and Nevis* (Unpublished doctoral dissertation). World Maritime University. http://commons.wmu.se/al-dissertations/514

Mishra, L. (2016). *Focus Group Discussion in Qualitative Research*. TechnoLEARN Vol. 6: No. 1: p. 1-5.

Mosetlhi, B.B.T. (2012). *The Influence of Chobe National Park on People's Livelihoods and Conservation Behaviors* (Unpublished doctoral dissertation). University of Florida, USA. https://ufdc.ufl.edu/UFE0043766/00001

Mwango, N.H. (2010). *Community Traditional Knowledge, Perceptions and Response to Flood Risks in Nyando Basin* (Unpublished Thesis). Kenyatta University, Western Kenya.

Nyumba, Wilson, Derrick, and Mukherjee (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. Methods in Ecology and Evolution. 2018; 9:20–32. https://doi.org/10.1111/2041-210X.12860

OMLopez Center (2017). *Impacts, Vulnerabilities and Adaptation.* Retrieved September 17, 2019, from PhilCCA: URL: www.omlopezcenter.org

Onwuegbuzie, A. J., Dickinson, W. B., Leech, N. L., & Zoran, A. G. (2009). A Qualitative Framework for Collecting and Analyzing Data in Focus Group Research. *International Journal of Qualitative Methods*, 8(3), 1–21. https://doi.org/10.1177/160940690900800301

Palaniswamy & Duraiswamy (2018). Focus Group Discussion (FGD) on the Business Challenges and operational issues of Textile Owners in Textile Market: A Qualitative Study. *IOSR Journal of Business and Management (IOSR-JBM*). Volume 20, Issue 9. Ver. VI (September. 2018), PP 38-44.

Severin, P. & Small, B.J. (2016). *Knowledge, Attitude, Practices/Behavior (KAP/B) Study on Climate Change*. Sta Lucia Baseline Study.

Smithsonian (2016). *Biodiversity Protects Fish from Climate Change*. [online]. https://www.si.edu/newsdesk/releases/biodiversity-protects-fish-climate-change

Songcuan, A.J.G. & Santos, M.D. (2013). Adaptive Strategies in Coping with Climate Variability: Experience of Philippine Traditional Indigenous Fishers. *Fish People*, 11 (3), 2-9.

UC -University of California, Santa Barbara. (2019). *Climate change is shifting productivity of fisheries worldwide*. ScienceDaily. Retrieved from www.sciencedaily.com/releases/2019/02/190228154846.htm

Tasoff, H. (2019). *Warm Seas Scatter Fish*. UC Santa Barbara, CA. https://www.news.ucsb.edu/2019/019360/warm-seas-scatter-fish

Wynne, S.P. (2015). *Developing an Adaptive Management Plan for*. Retrieved August 27, 2019, from Department of Fisheries and Marine Resources for the Government: http://www.gov.ai/documents/fisheries/Developing_an_Adapative_Management_Plan_ for Anguilla_Marine_Park_System.pdf

Zalameda, V.I. (2015). *Climate Change Adaptation Strategies in the Philippines - a Case Study within the Leyte Region*. (Unpublished doctoral dissertation). Uppsala University, Sweden. https://www.diva-portal.org/smash/get/diva2:820720/ FULLTEXT01.pdf